RFABM

RF Protection A-B Switch Module

Product User Manual

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RFABM

RF Protection A-B Switch Module

Product User Manual

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1 Precautions

WARNING!

This equipment is intended for indoor applications. To prevent fire or electrical shock, or damage to the equipment, do not expose units to water or moisture.

- Ensure adequate cooling and ventilation as specified.
- The product user manual should be read and understood before units are put into use.
- Do not operate unit without all covers and panels properly installed.

Cleaning

Use only a damp cloth for cleaning front panel. Use a soft dry cloth to clean top of unit. Do not use spray cleaner of any kind.

Overloading

Overloading wall outlets and extension cords can result in a risk of fire or electric shock. Use approved electrical cords.

Damage requiring service

Unplug unit and refer servicing to Pacific Broadband Networks qualified service personnel only.

Servicing

Do not attempt to service this unit yourself. Refer all servicing to Pacific Broadband Networks qualified service personnel only.

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2 Introduction

2.1 Overview

The RF protection A-B switch (RFABM) is a coaxial relay switch designed for automatic or manual operation. The switch is used in sub-headends with dual forward-path feeds or in a protected ring system. If one of the RF feeds fails, the switch will change to the other input and maintain RF output. An alternate application is for dual return paths from a remote node or from a remote sub-headend.

The standard module includes wide-band RF detection. The sum of all carriers present will determine the RF switching levels. There is an option to include RF filters for pilot-based operation, such as with our 4.5 MHz return-path pilot system. Pilot filters can also be ordered for forward-path applications.

The module includes high isolation impedance-matched RF switching relays, which are micro-processor controlled. The switching action may be initiated automatically or manually. In automatic mode, input port A has preference, unless it is outside the user-defined threshold range and input port B is inside.

The module has programmable maximum and minimum switching thresholds. Comprehensive status monitoring of each module is available via the OCM user interface and can be output to remote status monitoring systems.

2.2 Features

- Plug-and-play module.
- High reliability and compact design.
- CENELEC and NTSC standards up to 110 channels (both analogue and digital).
- Bandwidth 5 MHz to 1000 MHz for both forward- and return-path applications.
- Micro-processor controlled switching.
- Non-volatile memory to backup and save operator settings.
- Status monitored via OCM user interface and NMS3 network management system.
- Front-panel status LEDs.
- Optional pilot detection or single TV channel detection.
- RF test point -20 dB on front panel.

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2.3 Models and Options

Model code:

RFABM-[X]

RF Protection A-B Switch Module

Options:

X Frequency

- **0** Broadband detection
- **4.5** 4.5 MHz pilot detection
- **xx** Customer-specified pilot frequency filter in MHz

Examples:

RFABM-0

RF protection switch module with broadband detection.

RFABM-4.5

RF protection switch module with 4.5 MHz pilot detection for return-path applications.

RFABM-250

RF protection switch module with 250 MHz pilot detection.

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3 Installation

3.1 Equipment Inventory

On receiving your new RFABM, you should carefully unpack and examine the contents for loss or damage that may have occurred during shipping. Refer to warranty registration if loss or damage has occurred. The RFABM should consist of the following:

Qty	Description
1	RFABM module
1	Plug-and-play paddle board
1	Product user manual (includes individual test sheet)
1	Warranty registration certificate

3.2 Packaging and Transportation

Keep all packing boxes and packaging of the RFABM for future transport.

Use only the original packaging of the RFABM when transporting. This packaging has been specifically designed to protect the equipment.

3.3 Power and Cooling Requirements

The RFABM is powered by the power supply module of the OCM system.

The RFABM switching module and its corresponding OCM chassis should be located in an environment not exceeding a temperature range from 0 ºC to 45 ºC with the OCM fans running. The internal module temperature (parameter P06) should never reach 70 ºC.

Should the temperature exceed the above limits, the OCM should be relocated in the equipment rack where the ambient temperature will be less than 45 ºC.

The OCM chassis should have adequate ventilation clearance as required. See the installation and operating instructions for your OCM chassis.

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3.4 Module Installation and Adjustment

1. On the rear of the OCM, install the plug-and-play paddle board in the determined position and screw the retaining screw in loosely to allow vertical and horizontal alignment.
2. Hold the module upright and aligned to the OCM slide rails and slowly insert the OCM module until it is properly seated in the chassis and the plug-and-play paddle board. Do not use excessive force when inserting OCM module.

CAUTION:

If force is required to insert the module, then it may not be correctly seated in the slide rails or the plug-and-play paddle board.

Tip:

When inserting the module into the guide rails, vertically tilt the module slightly to check that the guides are properly seated on the rails.

3. Once the module is fully seated within the chassis, screw in the two front panel screws to secure the module to the chassis (finger tight only).
4. Tighten the screw on the rear of the plug-and-play paddle board.
5. When powered, indicators on front panel will light as follows:

POWER/ALARM	RED	RF level on both RF inputs (or pilot tones) is outside set limits
RF IN A	GREEN	Input port A selected
RF IN B	AMBER	Input port B not selected
RF OUT	AMBER	RF output level is low
RF AUTO	GREEN	Automatic switching selected

6. Connect the RF input and RF output to the F-Connectors on the PnP panel.
7. The RFABM may now be configured using the OCM user interface.
8. Allow 15 minutes for the module to reach nominal working temperature before final system alignment.
9. Set the module Operation Mode: Automatic or Manual via CONTROL1.
10. Set the number of analogue, 64QAM and 256QAM channels used in the system and their corresponding offsets (menu items CONTROL2 and CONTROL3).
11. Set RF_MAX (or CHA_MAX) level and RF_MIN (or CHA_MIN) level required for switching action and alarm thresholds (menu items CONTROL2 and CONTROL3).
12. Ensure all LEDs are now green, excluding input B LED.

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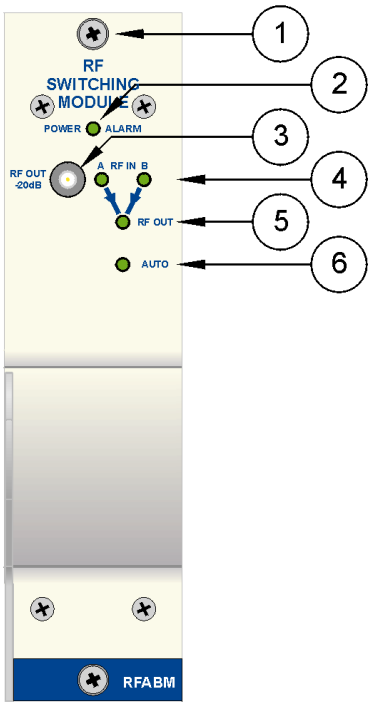
3.5 Front Panel



Item	Description		
1	SCREW	Front panel screw to fix RFABM to OCM	
2	POWER / ALARM	GREEN	Power ON, no alarm
		AMBER	Power ON, non-urgent alarm
		RED	Power ON, urgent alarm
3	RF OUT -20 dB	Provides a -20 dB sample of the RF output, via a 75 Ω Mini-SMB connector	
4	RF IN A	GREEN	Input port A selected
		AMBER	Input port A not selected
	RF IN B	GREEN	Input port B selected
		AMBER	Input port B not selected
5	RF OUT	GREEN	RF output present and within limits
		AMBER	RF output switched to non-valid input
6	AUTO	GREEN	Automatic switching selected
		AMBER	Manual switching selected

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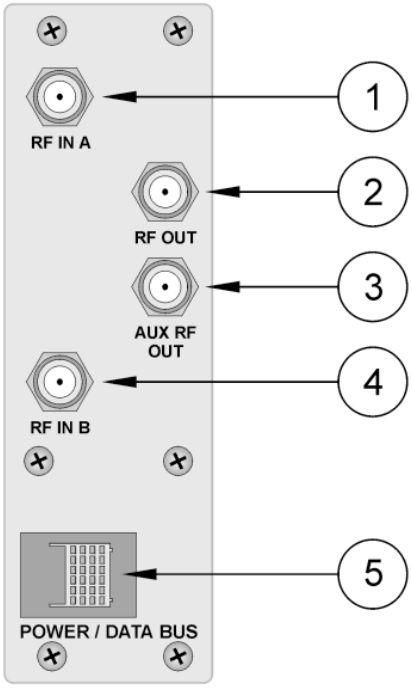
3.6 Rear Panel



Item	Description	
1	RF IN A	RF input port A
2	RF OUT	RF output port
3	AUX RF OUT	Auxiliary RF output (10 dB less than main RF output)
4	RF IN B	RF input port B
5	POWER / DATA BUS	Power feed from OCM chassis bus plane and data communication

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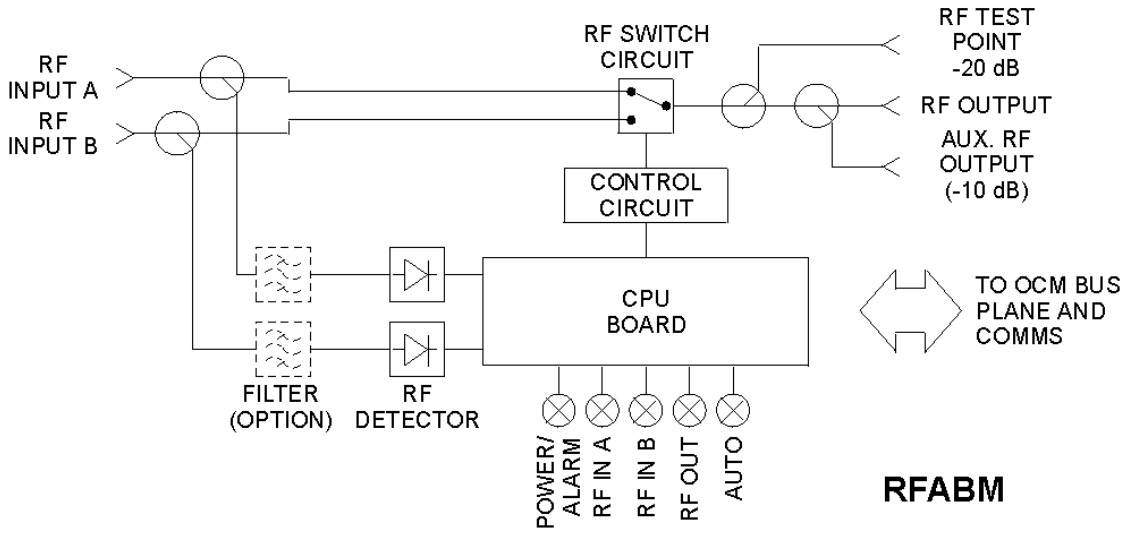
4 Technical Description

4.1 Overview

The RF path from the two RF inputs to the main RF output includes the RF level detection, switching circuit, -20 dB test point and the -10 dB auxiliary RF output.

The module employs a microcontroller to facilitate status monitoring and to control the switching of the RF inputs. Comprehensive monitoring of parameters relating to the RF inputs and output is provided, as well as information about the module itself. The module has several user controls that may be adjusted to optimise the system for specific requirements.



4.2 Physical Description

The RFABM unit is designed to occupy one slot of the OCM chassis. The format is in line with the Light Link Series 3 products which is the family making up the OCM system.

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4.3 Power & Data Input

Power and data are supplied to the RFABM from the rear of the module. The unit receives minimum DC voltages of 26.5, 14.5, -14.5 and 7.5 Volt from the OCM chassis bus plane which also supplies communications and a common alarm signal path back to the control module.

The chassis assigns the module with its slot number at parameter P05.

4.4 RFABM Switching

The RFABM provides >65 dB of isolation between inputs A and B.

The RFABM-0 performs its switching based on the detection of the broadband, total RF power within 5 MHz to 1000 MHz. In automatic switching mode, if both inputs are present and within the allowed limits defined by the user, the output taken is from input port A. If input port A falls outside the allowed limits, then the output will be taken from input port B so long as input port B is within set limits.

The readings at parameter P07 and P08 (RF input at input port A and input port B respectively) are true to within ±2 dBmV. The output is additionally tapped for a -20 dB test point and a -10 dB auxiliary output.

The RFABM-[X] models perform their switching based on the detection of a single pilot tone. This is due to the nature of return path transmission signals where the presence of CW carriers is not always constant or falls under the 100 MHz band.

With firmware version 3.8 or later, in the event of a power failure the RFABM switching always selects Port A. The unit will then select an input port based on the current switching thresholds. If neither port's input signal strength fall within the threshold limits, the unit will fall into an alarm state.

4.5 Alarm System

The RFABM generates alarms in two categories: non-urgent and urgent alarms.

	Non-urgent (AMBER)	Urgent (RED)
Power / Alarm	Either RF inputs (or pilot tones) are out of the limits.	Both RF inputs (or pilot tones) are out of the limits. Internal temperature of the module exceeds 70°C.
RF Out	RF output is switched to an input and its RF level (or pilot tone) is out of its limits.	

Note:

When the Auto LED is amber, this does not indicate an alarm condition; rather this shows that manual switching mode has been selected.

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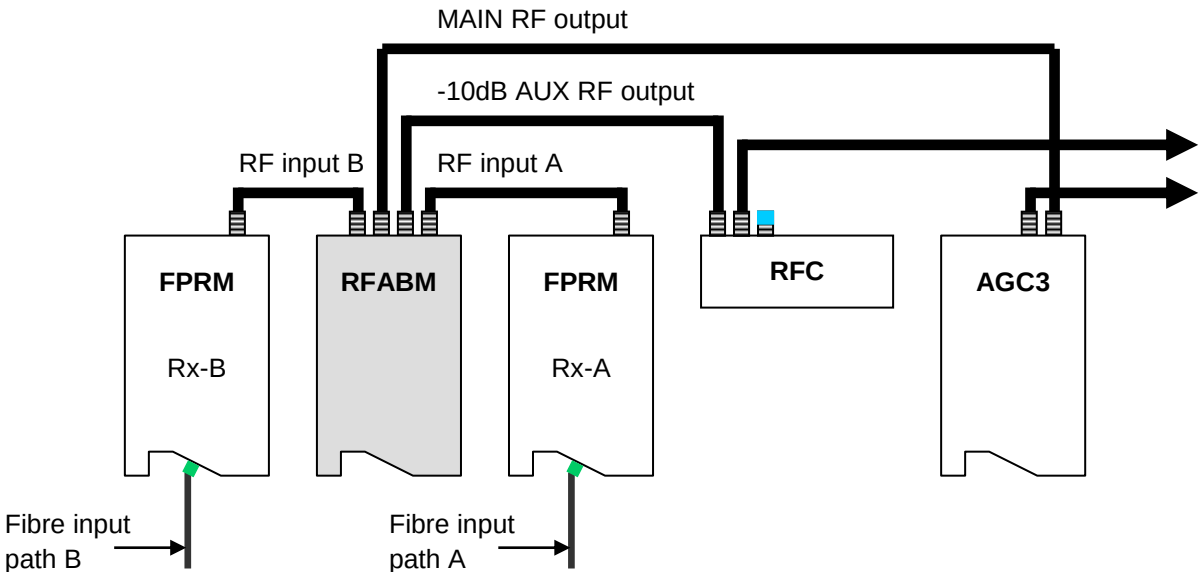
4.6 Typical Applications

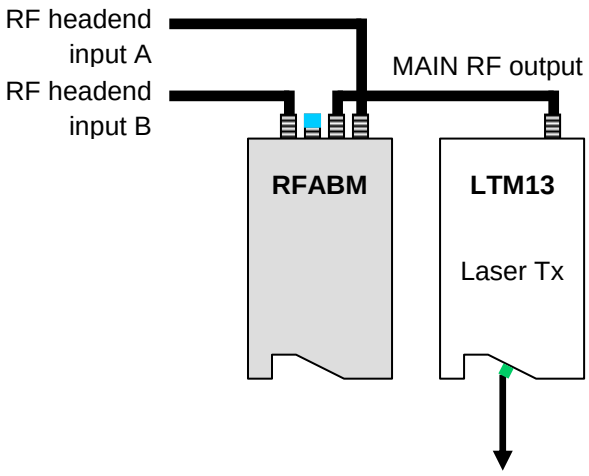
4.6.1 Fibre Redundancy

The RFABM switch used to offer fibre redundancy:



4.6.2 Alternate RF redundancy

Configuration to determine RF headend feeds to the system using the LTM13:



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5 Software Description - Operation

5.1 RFABM and OCM Program Structure

The basic program structure is similar to all OCM plug-in modules.

The RFABM software is fully automatic and constantly monitors parameters as outlined in **Section 5.4**. These parameters are stored in the modules EEPROM and/or micro-controller. Some may be changed via external communications.

As with all modules in the OCM product range, the RFABM is designed for monitoring and control locally with the OCM user interface, and remotely with our NMS3 system.

5.1.1 Current Software

Current software release is version 4.00.

5.1.2 Release History

v3.xx	The first software release.
v3.08	Standardisation and minor changes.
v4.00	Major control functionality upgrade.

5.1.3 Factory Defaults / EEPROM Settings

The software uses an EEPROM to save all settings for user defined control variables so that the user will not need to reset these in case of a power failure.

The factory default settings are as follows:

	CONTROL1	RF_MAX	RF_MIN	CHANNELS
RFABM-0	AUTO	50 dBmV	20 dBmV	42
RFABM-4.5	AUTO	45 dBmV	10 dBmV	1

	64QAMCH and 256QAMCH	64QAM and 256QAM	COMMON_TH	CHA_MAX and CHB_MAX
RFABM-0	0	0	YES	50 dBmV
RFABM-4.5	0	0	YES	45 dBmV

	CHB_MAX and CHB_MAX	CHA_HCTRL and CHB_HCTRL	CHA_HCTRL and CHB_HCTRL	CHB_MAX and CHB_MAX
RFABM-0	20	N	N	20
RFABM-4.5	10	N	N	10

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5.2 OCM User Interface Lock for Control Variable Access

OCM software version 4.0 and above has a keypad lock and unlock feature for accessing the control variables. This is so that only the trained technician has the ability to change any of the CONTROL variables, restricts an unauthorised person from modifying the control variables, and prevents tampering.

The OCM user interface will require the keypad unlock sequence to be input by the user if they intend to access any of the CONTROL variables for any given module. This includes the LCD's CONTRAST level. With the keypad locked, the user has access to the following menu items only: PBN STATUS, ALARMS and MODULES. When the keypad is unlocked, access to CONTROL1, CONTROL2 and CONTROL3 becomes available.

5.2.1 Unlock access to CONTROL variables

1. Ensure that the display is at the home screen with PBN STATUS displayed. If you are not sure of your location in the menu, press **ENTER** twice to go to the home screen.
2. Press the **right** arrow key four times.
3. Press **ENTER** once.

You now have full access to the CONTROL menu items.

The interface is in its unlocked condition. The user has access to six menu items. They are: PBN STATUS, ALARMS, MODULES, CONTROL1, CONTROL2 and CONTROL3.

5.2.2 Lock access to CONTROL variables

There are three ways to lock access to CONTROL variables:

- Resetting the power
- Automatic time-out
- Manual operation

By resetting the power, the interface will start up in the locked condition by default.

Automatic time-out happens when there has been no activity (key pressing) for 15 minutes. This will also bring the display back to the PBN STATUS menu.

Manual Operation

1. Ensure that the display is at the home screen with PBN STATUS displayed. If you are not sure of your location in the menu, press **ENTER** twice to go to the home screen.
2. Press the **left** arrow key once.
3. Press **ENTER** once.

You have now locked access to the CONTROL menu items.

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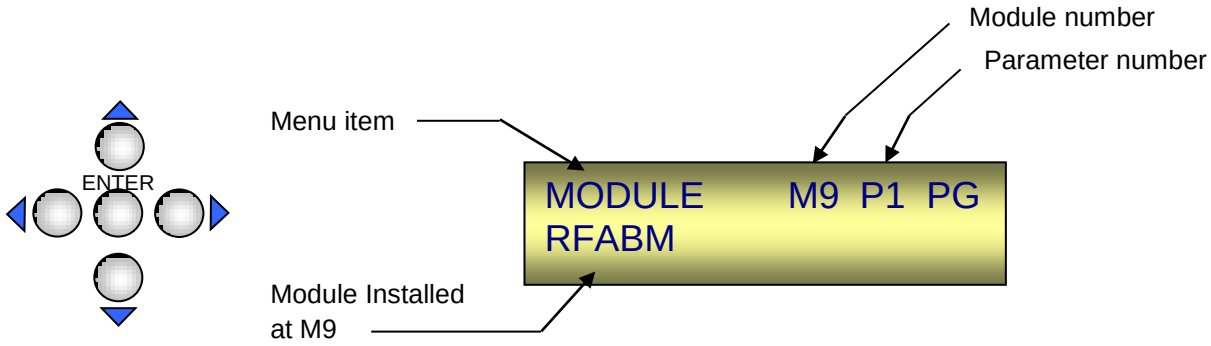
5.3 Programming Sequence for RFABM

The user has the ability to perform the following functions on the RFABM via the OCM user interface:

- Select the module within the OCM for monitoring and controlling.
- Check all 32 parameters in the RFABM.
- Select automatic or manual switching: CONTROL1.
- Select the number of RF channels used: CONTROL2 and CONTROL3 – CHANNELS, 64QAMCH and 256QAMCH.
- Define the maximum RF input alarm threshold level and alarm type: CONTROL2 and CONTROL3 – CHA_MAX, CHB_MAX, CHA_HCTRL and CHB_HCTRL.
- Define the minimum RF input alarm threshold level and alarm type: CONTROL2 and CONTROL3 – CHA_MIN, CHB_MIN, CHA_LCTRL and CHB_LCTRL.
- Manually switch between input A and input B: CONTROL2 and CONTROL3 – INPUTSEL.

5.3.1 Select the Module within the OCM for Monitoring and Controlling



1. Scroll down to menu item **MODULE** using the ▼ key.
2. Place the cursor at **MX** using the ▶ key, where **X** represents the slot number (1 – 9) on the chassis, into which the module is inserted.
3. Select the module number using the ▼ or ▲ keys, e.g. if the **RFABM** is in slot 9, select **M9**.

You have now selected the module within the OCM to monitor and control.

Note:

The OCMR has four lines of text on its LCD, therefore more information may be displayed than shown in the image above. For more information please refer to the OCMR operations manual.

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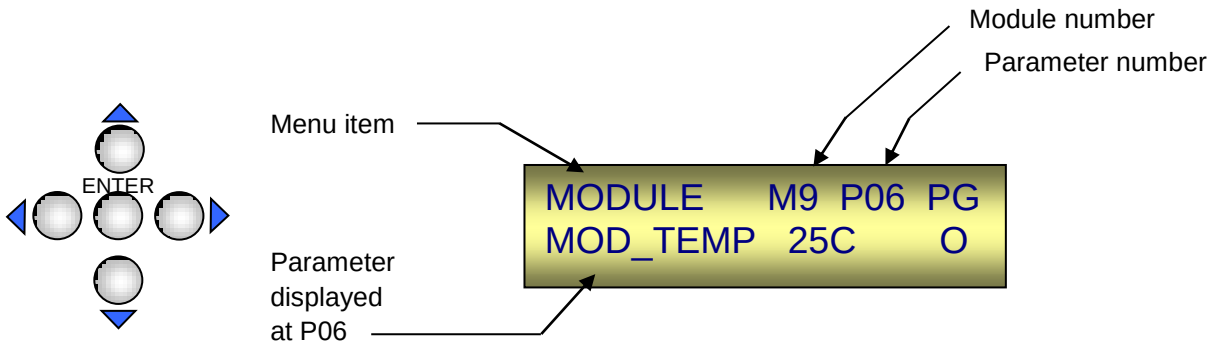
5.3.2 Check all 32 Parameters in the RFABM

For a full list and explanation of the parameters used in the RFABM refer to **Section 5.4**.



1. Scroll down to menu item **MODULE**.
2. Place the cursor at **MX** using the ▶ key, where **X** represents a slot number (1 – 9) on the chassis into which the module is inserted.
3. Select the module number using the ▼ or ▲ keys, e.g. If the **RFABM** is in slot 9, select **M9**.
4. Move the cursor to **PXX** using the ▶ key, where **XX** is a parameter from 01 to 32.
5. Press the ▼ or ▲ keys to scroll through the parameter list and values.

Note:

The OCMR has four lines of text on its LCD, therefore more information may be displayed than shown in the image above. For more information please refer to the OCMR operations manual.

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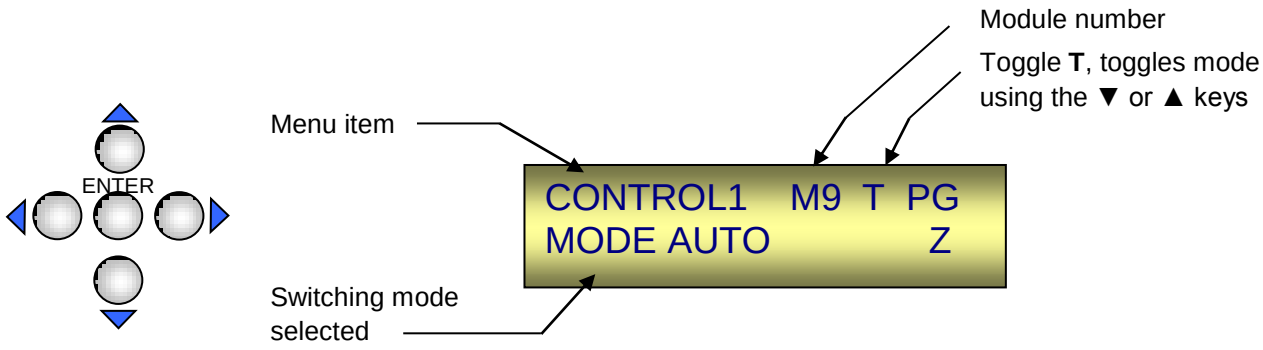
5.3.3 Select Automatic or Manual Switching

The RFABM will be in its default mode of auto switching when first powered up.

To change to manual switching:



1. Scroll down to menu item **CONTROL1**.
2. Place the cursor at **T** using the ▶ key.
3. Press the ▼ or ▲ keys to toggle between **AUTO** and **MAN**.

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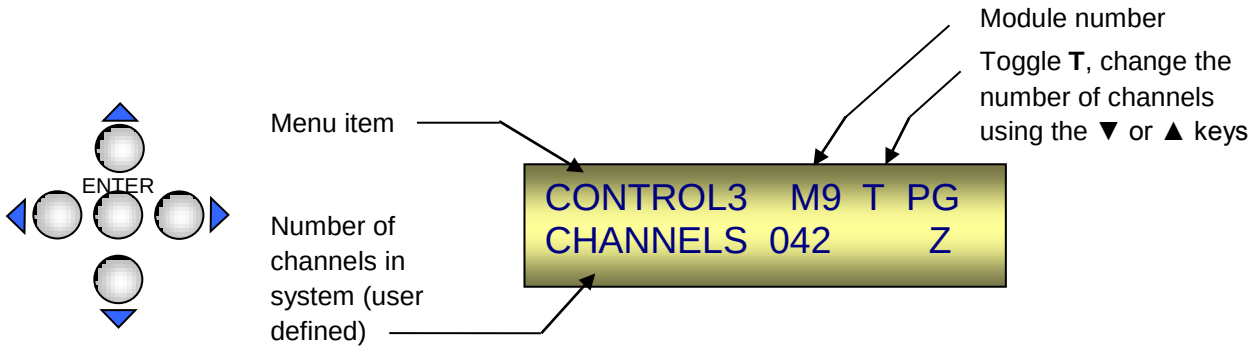
5.3.4 Define the number of analogue RF channels used

The user will need to define the number of RF channels through the system to correctly read the levels present, so that switching may occur at the desired levels.


Module number
Toggle **T**, change the number of channels using the ▼ or ▲ keys
Menu item
ENTER
CONTROL3 M9 T PG
CHANNELS 042 Z
Number of channels in system (user defined)

1. Scroll down to **CONTROL2**.
2. Place the cursor at **T** using the ▶ key.
3. Press the ▼ or ▲ keys to scroll through the menu items until you reach **CHANNELS**.
4. Scroll down to **CONTROL3**.
5. Place the cursor at **T** using the ▶ key.
6. Press the ▼ or ▲ keys to select the closest number of RF channels relating to the system.

Note:

The available RF channels are 1 ~ 127 as per V4.00. The number of analogue RF channels can be limited depending on the number of 64QAM and 256QAM digital channels, and vice versa.

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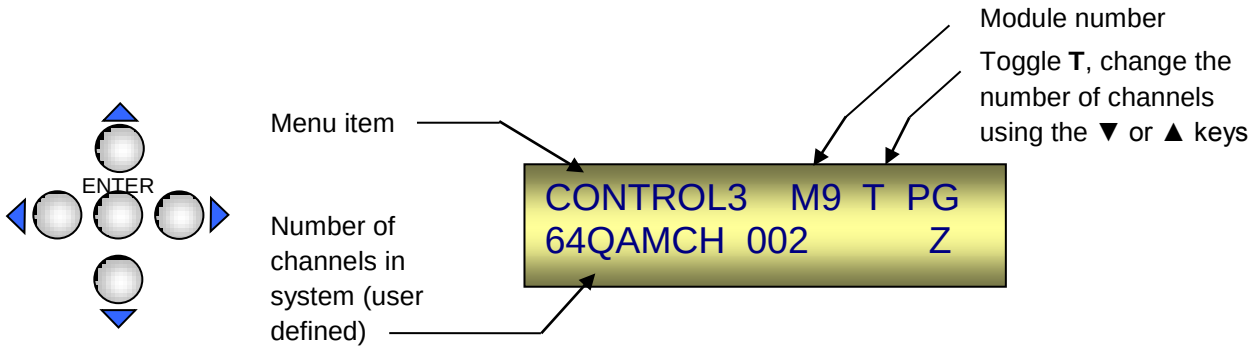
5.3.5 Define the number of 64QAM and 256QAM digital channels used

The user will need to define the number of digital channels through the system to correctly read the levels present, so that switching may occur at the desired levels.


Module number
Toggle **T**, change the number of channels using the ▼ or ▲ keys
ENTER
Menu item
CONTROL3 M9 T PG
64QAMCH 002 Z
Number of channels in system (user defined)

1. Scroll down to **CONTROL2**.
2. Place the cursor at **T** using the ▶ key.
3. Press the ▼ or ▲ keys to scroll through the menu items until you reach **64QAMCH** or **256QAMCH** respectively.
4. Scroll down to **CONTROL3**.
5. Place the cursor at **T** using the ▶ key.
6. Press the ▼ or ▲ keys to select the closest number of digital channels relating to the system.

Note:

The available channels are 1 ~ 127 as per V4.00. The number of 64QAM channels can be limited depending on the number of analogue and 256QAM digital channels, and vice versa.

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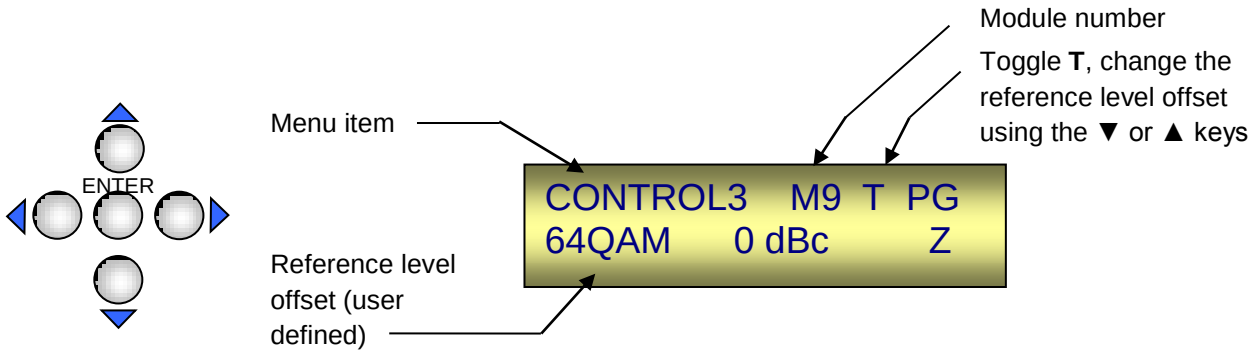
5.3.6 Define the 64QAM and 256QAM RF reference level offset

The user will need to define the offset between the analogue reference level and the 64QAM reference level. Likewise the user will need to define the offset between the analogue reference level and the 256QAM reference level.


Module number
Toggle **T**, change the reference level offset using the ▼ or ▲ keys
Menu item
ENTER
CONTROL3 M9 T PG
64QAM 0 dBc Z
Reference level offset (user defined)

1. Scroll down to **CONTROL2**.
2. Place the cursor at **T** using the ▶ key.
3. Press the ▼ or ▲ keys to scroll through the menu items until you reach **64QAM** or **256QAM** respectively.
4. Scroll down to **CONTROL3**.
5. Place the cursor at **T** using the ▶ key.
6. Press the ▼ or ▲ keys to select the offset for the respective RF channel type (64QAM or 256QAM).

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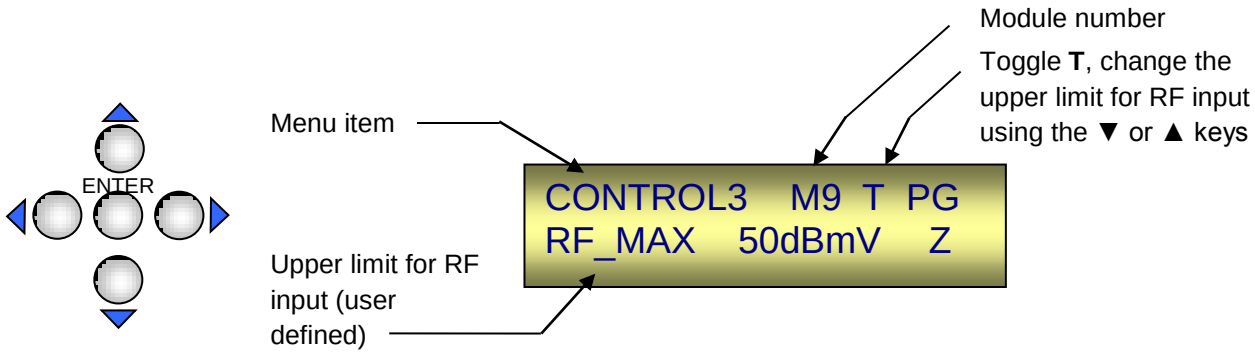
5.3.7 Define the maximum RF input (or pilot tone) level for switching action

The user may need to define the maximum RF input (or pilot tone) level for switching action to occur. This is the total RF input level on each RF input port. The factory default setting is noted on the test sheet.


Module number
Toggle **T**, change the upper limit for RF input using the ▼ or ▲ keys
Menu item
ENTER
CONTROL3 M9 T PG
RF_MAX 50dBmV Z
Upper limit for RF input (user defined)

1. Scroll down to **CONTROL2**.
2. Place the cursor at **T** using the ▶ key.
3. Press the ▼ or ▲ keys to scroll through the menu items until you reach **RF_MAX**.
4. Scroll down to **CONTROL3**.
5. Place the cursor at **T** using the ▶ key.
6. Press the ▼ or ▲ keys to select the required upper limit for switching action.

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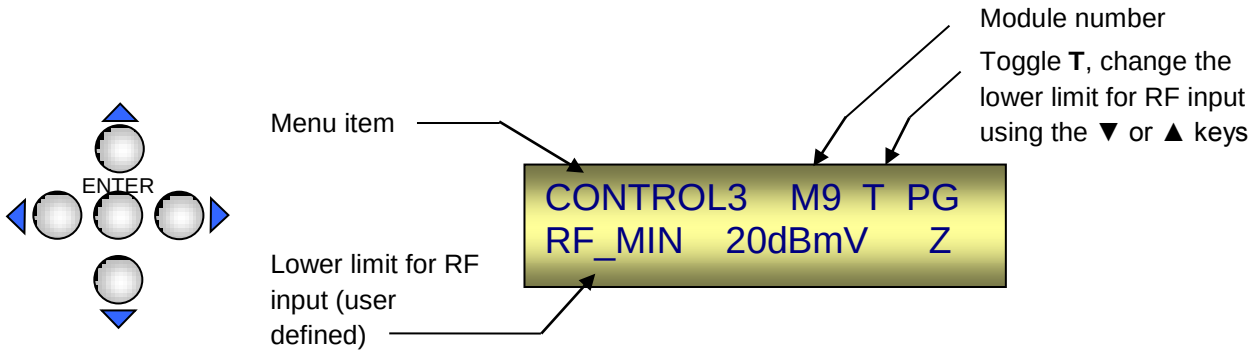
5.3.8 Define the minimum RF input (or pilot tone) level for switching action

The user may need to define the minimum RF input (or pilot tone) level for switching action to occur. This is the total RF input level on each RF input port. The factory default setting is noted on the test sheet.


Module number
Toggle **T**, change the lower limit for RF input using the ▼ or ▲ keys
Menu item
ENTER
CONTROL3 M9 T PG
RF_MIN 20dBmV Z
Lower limit for RF input (user defined)

1. Scroll down to **CONTROL2**.
2. Place the cursor at **T** using the ▶ key.
3. Press the ▼ or ▲ keys to scroll through the menu items until you reach **RF_MIN**.
4. Scroll down to **CONTROL3**.
5. Place the cursor at **T** using the ▶ key.
6. Press the ▼ or ▲ keys to select the required lower limit for switching action.

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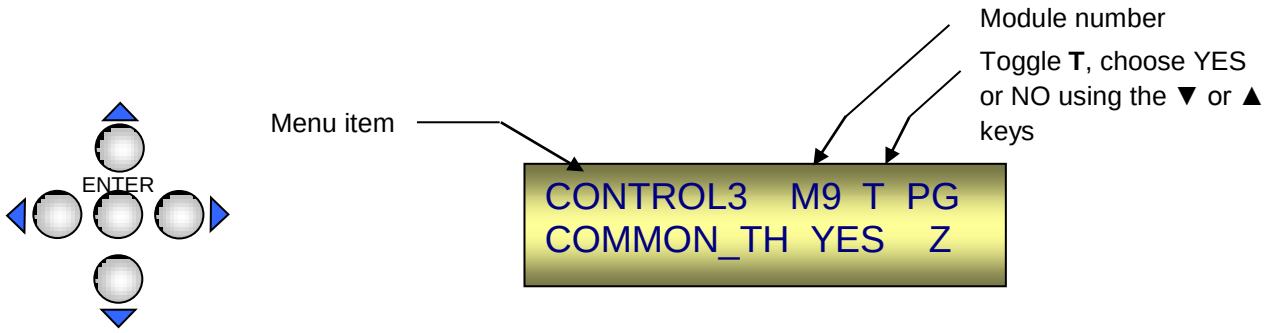
5.3.9 Define common alarm thresholds for RF channels

The user has the ability to control the RF input alarm thresholds levels for individual input port regardless of the switching thresholds; this allows full customisation given the implemented system. For simplicity it may be desired to have the same alarm thresholds for both input ports as opposed to individual input port thresholds.



1. Scroll down to **CONTROL2**.
2. Place the cursor at **T** using the ▶ key.
3. Press the ▼ or ▲ keys to scroll through the menu items until you reach **COMMON_TH**.
4. Scroll down to **CONTROL3**.
5. Place the cursor at **T** using the ▶ key.
6. Press the ▼ or ▲ keys to select **YES** if you wish to have the same alarm thresholds for both RF channels, **NO** if you wish to have different alarm thresholds for both.

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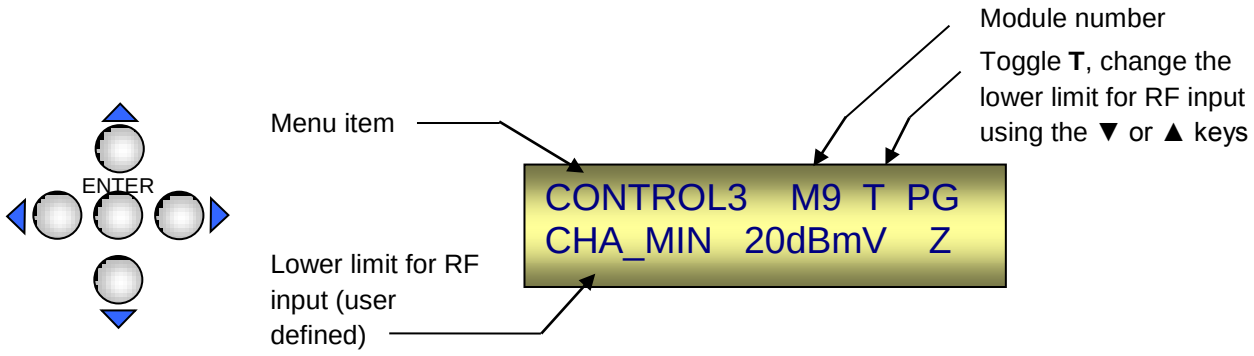
5.3.10 Adjust alarm thresholds for the RF inputs port A and port B

The user can configure the maximum and minimum RF input levels for each channel that cause alarms. The user can also configure which type of alarm is sent: no alarm, non-urgent alarm or urgent alarm.


Module number
Toggle **T**, change the lower limit for RF input using the ▼ or ▲ keys
Menu item
ENTER
CONTROL3 M9 T PG
CHA_MIN 20dBmV Z
Lower limit for RF input (user defined)

1. Scroll down to **CONTROL2**.
2. Place the cursor at **T** using the ▶ key.
3. Press the ▼ or ▲ keys to scroll through the menu items until you reach **CHA_MAX**, **CHA_MIN**, **CHA_HCTRL**, **CHA_LCTRL**, **CHB_MAX**, **CHB_MIN**, **CHB_HCTRL** or **CHB_LCTRL.**

   HCTRL and **LCTRL** control the alarm type.
4. Scroll down to **CONTROL3**.
5. Place the cursor at **T** using the ▶ key.
6. Press the ▼ or ▲ keys to select the required limit or to set the alarm type.
   If **COMMON_TH** is **NO** then channel B will also be available to adjust alarm thresholds, otherwise it will send alarms on the same basis as channel A.

Note:

Using **CONTROL2** and **CONTROL3** to adjust **RESET_CFG** will reset input port A and input port B alarm types and thresholds to factory default.

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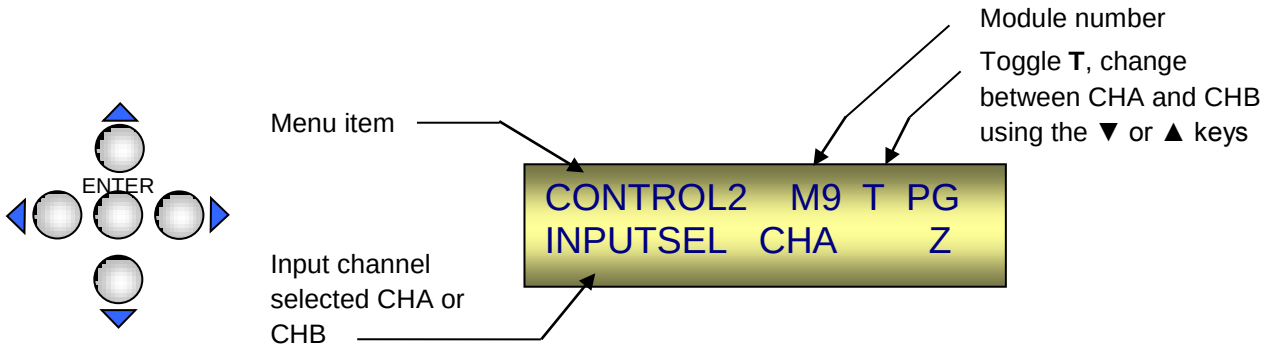
5.3.11 Manually switch between input port A and input port B

To manually switch between input port A and input port B, **CONTROL1** must be in the **MAN** setting (refer to **Section 5.3.3**).


Module number
Toggle **T**, change between CHA and CHB using the ▼ or ▲ keys
ENTER
Menu item
CONTROL2 M9 T PG
INPUTSEL CHA Z
Input channel selected CHA or CHB

1. Scroll down to menu item **CONTROL1**. Change **MODE** to **MAN**.
2. Scroll down to **CONTROL2**.
3. Place the cursor at **T** using the ▶ key.
4. Press the ▼ or ▲ keys to select **INPUTSEL**.
5. Scroll down to **CONTROL3**.
6. Place the cursor at **T** using the ▶ key.
7. Press the ▼ or ▲ keys to select **CHA** for input port A or **CHB** for input port B.

Note:

If the input port selected has an invalid input level (according to the RF min. and max. levels defined) the unit will indicate an alarm condition.

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5.4 RFABM - Parameter List and Alarm Limits

Parameter	Display (examples only)			Parameter function
P01	RFABM-0			Model Number of unit
P02	S/N 0507346			Serial Number of unit
P03	S02185	V4.00		Firmware version installed in unit
P04	A00918			Module PCB load
P05	SLOT_NUM	10		Module chassis slot ID
P06	MOD_TEMP	26.3C	O	Temperature inside module O = OK 0 °C to 70 °C U = Urgent alarm > 70 °C
P07	CHA	32dBmV	O	Input port A RF level, dependent on the number of CHANNELS, 64QAM and 256QAM values set by the user O = OK Within CHA_MIN and CHA_MAX N = Non-urgent Outside limits
P08	CHB	32dBmV	O	Input port B, RF level, dependent on the number of CHANNELS, 64QAM and 256QAM values set by the user O = OK Within CHA_MIN and CHA_MAX N = Non-urgent Outside limits
P09	NOT USED		A	This parameter is not used.
P10	+5VRL	5.0Vdc	O	+5 Vdc power rail O = OK 4.5 ~ 5.5 Vdc U = Non-urgent < 4.5 Vdc U = Urgent > 5.5 Vdc
P11	+12VRL	12.2Vdc	O	+12 Vdc power rail O = OK 11 ~ 13 Vdc U = Non-urgent < 11 Vdc U = Urgent > 13 Vdc

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Parameter	Display (examples only)			Parameter function
P12	+24VRL	24.5Vdc	O	+24 Vdc power rail O = OK 23 Vdc to 25 Vdc U = Non-urgent < 23 Vdc U = Urgent > 25 Vdc
P13	NOT_USED		A	
P14	NOT_USED		A	
P15	ALM_ R	OFF	Z	Summary alarm LED, red indicator OFF No alarm ON Urgent if P16 is OFF ON Non-urgent if P16 is ON
P16	ALM_ G	ON	Z	Summary alarm LED, green indicator ON No alarm if P15 is OFF ON Non-urgent if P15 is ON OFF Urgent alarm
P17	RFABM_ALM	OK	Z	Common alarm line, flags OCM user interface if urgent OK No urgent alarm ALM Urgent alarm
P18	NOT USED		Z	This parameter is not used
P19	MODE	AUTO	Z	Mode setting either Auto or Manual for switching action. Set at CONTROL1
P20	CHANNELS	40	Z	Mirror of CONTROL2
P21	INPUT_ALM	YES	U	RF Input Alarm
P22	SWITCH	CHA	Z	State of switch
P23	CHANNELS	40	Z	Mirror of CONTROL3
P24	INPUTSEL	CHA	Z	RF input port being selected
P25	RF_MAX	40dBmV	Z	Input RF max. level for switching decision
P26	RF_MIN	20dBmV	Z	Input RF min. level for switching decision
P27	CHANNELS	064	Z	Number of analogue channels
P28	64QAMCH	000	Z	Number of 64QAM channels

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P29	256QAMCH	000	Z	Number of 256QAM channels
P30	64QAM	20dBc	Z	64QAM level offset from analogue level
P31	256QAM	20dBc	Z	256QAM level offset from analogue level
P32	COMMON_TH	YES	Z	Common threshold

Note:

The above values displayed are for monitoring purposes only and may vary in accuracy up to 10%

Status character definitions

O indicates Normal

N indicates Non-urgent Alarm

U indicates Urgent Alarm

Z indicates No Alarm State

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6 Specifications

RF Performance

Automatic operation:	RF level detection
Manual operation:	Override AB switch via OCM user interface or network management software
Bandwidth:	5 MHz to 1000 MHz
Frequency flatness:	< ± 0.5 dB
RF isolation A to B:	> 65 dB
Insertion loss (A or B to main):	≤ 3.5 dB
Insertion loss (A or B to auxiliary):	≤ 13.5 dB
Typical RF operating input:	+20 dBmV to +40 dBmV for 4 to 64 channels
RF detection:	Broadband detection or optional single frequency pilot detection
Operating range for broadband detection:	+15 dBmV to +65 dBmV
Lower threshold:	+15 dBmV to +61 dBmV
Upper threshold:	+19 dBmV to +65 dBmV
Operating range for pilot detection:	+5 dBmV to +55 dBmV
Lower threshold:	+5 dBmV to +51 dBmV
Upper threshold:	+9 dBmV to +55 dBmV
Threshold set-points:	Operator controlled via OCM user interface or network management software
Minimum operating window between lower and upper threshold set-points:	> 4 dB
Switching speed after detection:	10 ms (typical)
RF input/output impedance:	75 Ω

General

Power:	Powered by OCM system
Operating temperature:	0°C to 45 °C
Connectors	
Test point:	75 Ω Mini-SMB
RF ports:	75 Ω SCTE F-type
Dimensions (H x W x D):	160 x 44 x 360 mm
Ship size (H x W x D):	280 x 70 x 570 mm
Weight:	1.2 kg
Ship weight:	1.7 kg
Network management:	NMS3 via OCM system

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7 Product Warranty

Pacific Broadband Networks warrants its equipment to be free of manufacturing defects in material and workmanship for a period of one year from date of shipment, provided it is installed and operated in accordance with factory recommendations.

The liability of Pacific Broadband Networks under this warranty is solely limited to repairing; replacing or issuing credit provided that:

1. The warranty registration has been completed and received by Pacific Broadband Networks.
2. Pacific Broadband Networks' helpdesk is promptly notified in writing or by telephone that a failure or defect has occurred.
3. A return authorisation number is obtained from Pacific Broadband Networks' helpdesk and clearly marked on the outside of the shipping container and all documents.
4. Customer is responsible for all shipping and handling charges. C.O.D. and freight collect will not be accepted without prior approval from Pacific Broadband Networks' helpdesk.
5. The equipment (in PBN's sole discretion) has not been abused, misused or operated under conditions outside manufacturer's specifications.

The warranty does not cover the following:

1. Products purchased from someone other than an authorised Pacific Broadband Networks dealer.
2. Damage caused by accident, negligence, misuse, abuse, improper operation or failure to operate the equipment within the manufacturer's specifications.
3. Damage caused by fluctuation in electrical current, lightning, power surges, etc.
4. Damage resulting from overhaul, repair or attempt to repair caused by someone other than Pacific Broadband Networks' qualified service personnel.
5. Any product, in which the serial number has been defaced, modified or removed.
6. Any product that has been opened or modified without prior written permission from PBN.
7. Replacement of parts necessitated by normal wear and tear.
8. Any consequential or implied damages.

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8 Declaration of Conformity

According to ISO/IEC Guide 22 and EN45014

Manufacturer's Name:	Pacific Broadband Networks
Manufacturer's Address:	8-10 Keith Campbell Court, Scoresby, Victoria 3179, Australia
Declares, that the product Product Name:	RFABM – RF Protection A-B Switch Module

Conforms to the following standards:

Safety:	EN 80083-1, EN 60950, IEC 950, AS/NZS 3260:1993, EN-60825-1, IEC 825-1, AS/NZS 2211.1 Laser Safety
EMC:	EN 50083-2, EN-55022:1994, IEC/CISPR 22:1993, AS/NZS CISPR 22:2006
CATV/HFC:	EN-50083

Supplementary Information:

CE

This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

The product herewith complies with the requirements of the following directives and carries the CE-marking accordingly:

- The EMC Directive 89/336/EEC
- The Low Voltage Directive 73/23/EEC

The product was tested in a typical configuration with Pacific Broadband Networks.

FCC WARNING

This equipment has been tested and found to comply with the limits for class A device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates uses and can radiate radio frequency and, if not installed in and used in accordance with the instructions, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at the user's own expense.

For Compliance Information ONLY, contact:

Australia:	Pacific Broadband Networks 8-10 Keith Campbell Court, Scoresby, Victoria 3179, Australia Phone:+61-3-9780-5100, Fax +61-3-9763-5522 Email: sales@pbn.com.au
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9 Notes

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